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3.14. (Amended) The composition for an organic EL element as claimed in claim 2, wherein the ink-jet method uses an ink-jet device having a nozzle with a nozzle hole for discharging the composition, in which the composition contains a wetting agent for preventing the composition from being dried and solidified at the nozzle of the ink-jet device.

REMARKS

Claims 1-2, 4-14 and 16-31 are pending herein. The Office Action withdraws claims 18-31 from consideration as being subject to a Restriction Requirement; objects to new Figures 3 and 4 under 35 U.S.C. § 132; rejects claims 1-2 and 4-17 under 35 U.S.C. § 112, first paragraph; rejects claims 6 and 14-15 under 35 U.S.C. § 112, second paragraph; rejects claims 1-2, 4-6 and 12 under 35 U.S.C. § 102(e); and rejects claims 7-11, 13 and 16-17 under 35 U.S.C. § 103(a). This Amendment deletes Figure 4; amends Figures 3 and 5; amends the specification; cancels claim 15; and amends claims 1, 6 and 14. The amendments are shown in the attached Appendix. No new matter is added.

Entry of this Amendment is proper under 37 C.F.R. §1.116 because the Amendment places the application in condition for allowance (for the reasons discussed herein) or places the application into better form for Appeal should an Appeal be necessary. The Amendment does not present any additional claims without canceling a corresponding number of finally rejected claims, does not raise the issue of new matter, and does not raise any new issues requiring additional search and/or consideration since the Amendment is directed to subject matter previously considered during prosecution. Furthermore, the amendments are necessary and were not earlier presented because they are in response to issues raised in the Final Rejection. The Amendment merely deletes Figure 4; amends Figures 3 and 5; amends the specification; cancels claim 15 and amends claims 1, 6 and 14. Applicants respectfully request entry of the Amendment.

I. Objection Under 35 U.S.C. § 132

The Office Action objects to new Figure 3 and 4 submitted with the July 13, 2000, Amendment under 35 U.S.C. § 132 as introducing new matter. This Amendment amends Figure 3 and deletes Figure 4 to overcome this objection. The requirements of 35 U.S.C. § 132 are satisfied. Figure 5 is amended to be labeled as Figure 4. Reconsideration and withdrawal of the objection are respectfully requested.

II. Rejection Under 35 U.S.C. § 112, First Paragraph

The Office Action rejects claims 1-2 and 4-17 under 35 U.S.C. § 112, first paragraph, as containing subject matter not adequately described in the original specification. This Amendment cancels claim 15 and amends claims 1, 6 and 14 to overcome this rejection. Claims 1-2, 4-14 and 16-17 satisfy the requirements of 35 U.S.C. § 112, first paragraph. Reconsideration and withdrawal of the rejection are respectfully requested.

III. Rejection Under 35 U.S.C. § 112, Second Paragraph

The Office Action rejects claims 6 and 14-15 under 35 U.S.C. § 112, second paragraph, as being indefinite. This Amendment cancels claim 15 and amends claims 6 and 14 to overcome this rejection. Claims 6 and 14 satisfy the requirements of 35 U.S.C. § 112, second paragraph. Reconsideration and withdrawal of the rejection are respectfully requested.

IV. Rejection Under 35 U.S.C. § 102(e)

The Office Action rejects claims 1-2, 4-6 and 12 under 35 U.S.C. § 102(e) as being anticipated by Shi (U.S. Patent No. 5,665,857). The Office Action alleges that the claimed invention is anticipated by Shi for all of the reasons presented in the previous Office Action. Applicants respectfully traverse this rejection.

Applicants respectfully submit that the rejection is improper because Shi fails to, implicitly or explicitly, disclose each and every limitation of the claimed invention. More specifically, nowhere does Shi disclose a composition for an organic EL element comprising a

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precursor polymer and a fluorescent dye, wherein the dye has substantially no substituent that is able to attach to the precursor polymer, as claimed in claim 1.

The composition of the claimed invention is specifically defined as comprising a fluorescent dye that has substantially no substituents to allow the dye to chemically bond to the precursor polymer in the composition. In contrast, nowhere does Shi disclose a composition comprising such a fluorescent dye. In fact, as explained in the July 13, 2000, Amendment, Shi specifically teaches chemically bonding a dye with a precursor polymer, such as PPV, in order to obtain a luminescent layer having a high degree of uniformity and improved efficiency. See Shi at col. 1, lines 36-60. Shi is thus directly contrary to the claimed invention. The fact that the dye of Shi chemically bonds to the precursor polymer of the disclosed composition is further proven by the disclosure of Shi. In particular, all of the dyes disclosed by Shi have nucleophilic substituents including, for example,  $\text{SO}_3^-$ ,  $\text{NH}^-$ ,  $\text{S}^-$  and  $\text{O}^-$ . The presence of these substituents in the dyes of Shi proves that the dyes disclosed in Shi are easily chemically bonded to the precursor polymer of the disclosed composition, and thus do not anticipate the fluorescent dye of the claimed composition.

Further, Applicants respectfully submit that Tables 1-7 of the original specification provide sufficient disclosure to adequately support the composition defined in claim 1. That is, because Tables 1-7 present fluorescent dyes that do not have a nucleophilic substituent, Applicants respectfully submit that one of ordinary skill in the art would recognize that the fluorescent inks of the claimed invention do not have the requisite substituents necessary to enable the dyes to chemically bond to the precursor polymer of the claimed composition. As a result, the dye of the claimed composition is added without being chemically bonded or attached to the precursor polymer. This allows the claimed composition to provide advantages such as enabling the composition to be used with an ink-jet method and enabling the composition to be improved as a precursor by adding a wetting agent. These advantages are

not provided by compositions wherein a fluorescent dye is chemically bonded to a precursor polymer, and thus, would not be provided by the composition of Shi.

Moreover, the physical and chemical operation of the materials of Shi is different from the operation of the claimed invention. The Kasha theorem establishes the general principal of relaxation processes from an excited state, and explains that the luminescent phenomenon is a phenomenon that occurs at the lowest excited state. More specifically, in cases where a moiety having a high lowest excited state and a moiety having a low lowest excited state are adjacent to each other, even when the moiety having the high lowest excited state is selectively excited, energy transfer occurs immediately, causing luminescence from the low lowest excited state to be observed.

Because this energy transfer is dependent on the distance between the energy donor and the energy acceptor, energy transfer efficiency substantially decreases as the distance between the donor and the acceptor increases. Accordingly, because the dye in the composition of the claimed invention is not chemically bonded to the precursor polymer, the distance between the donor and the acceptor is relatively great. As a result, the composition of the claimed invention makes it possible to obtain luminescence of a dye having a high lowest excited state without energy transfer to another material, as in Shi. In particular, the Examples in the specification of the instant application indicate that blue luminescence can be observed even if a fluorescent dye that exhibits blue luminescence, such as distyryl-biphenyl, is dispersed in PPV. This is possible because the dye is not chemically bonded to the precursor polymer, allowing the distance between the dye and the precursor polymer to be significantly greater than it would be if the dye were bonded to the precursor polymer.

In contrast, because the dye in the composition of Shi is chemically bonded to the precursor polymer, the distance between the dye and the precursor polymer will be smaller than the distance between the dye and the precursor polymer of the claimed composition.

Thus, the composition of Shi will experience more efficient energy transfer. As a result, it would be difficult to obtain luminescence from a dye having a high lowest excited state (e.g. a dye that exhibits blue luminescence), as compared with PPV, in the composition of Shi.

For at least these reasons, the claimed invention is not anticipated by the composition of Shi. Reconsideration and withdrawal of the rejection are respectfully requested.

V. Rejections Under 35 U.S.C. § 103(a)

A. Claims 7-11 Over Shi In View Of Yamamoto, and Further In View Of Mori

The Office Action rejects claims 7-11 under 35 U.S.C. § 103(a) as having been obvious over Shi in view of Yamamoto (U.S. Patent No. 5,540,999) and Mori (U.S. Patent No. 5,281,489). The Office Action alleges that the claimed invention would have been obvious over the composition of Shi in view of the teachings of Yamamoto, and further in view of the teachings of Mori. Applicants respectfully traverse this rejection.

Applicants respectfully submit that the rejection is improper because Shi in view of Yamamoto, and further in view of Mori, does not teach or suggest the claimed invention. More specifically, for all of the reasons discussed above, Shi does not teach or suggest the composition of claim 1, from which claims 7-11 depend, comprising a fluorescent dye having substantially no substituents to attach to the precursor polymer of the composition. Instead, Shi specifically teaches a composition comprising dyes that contain nucleophilic substituents that are specifically disclosed as being chemically bonded to the precursor polymer of the disclosed composition. See Shi at col. 1, lines 36-60. Nowhere does Shi teach or suggest that the materials should be altered to prevent the disclosed bonding, so as to arrive at the present claimed invention.

In addition, as explained above, the lack of chemical bonding between the dye and the precursor polymer of the claimed composition allows the claimed composition to provide numerous advantages that are not provided by the composition of Shi. Applicants respectfully

submit that because Shi fails to teach or suggest providing a dye lacking necessary substituents to chemically bond to the precursor polymer of the composition, the claimed composition would not have been obvious from the composition of Shi.

Furthermore, nowhere does Shi teach or suggest modifying the disclosed composition so as to arrive at the claimed invention. That is, because Shi fails to teach or even suggest modifying the disclosed composition to include a dye that is not capable of bonding to the precursor polymer of the composition, as claimed, Applicants respectfully submit that no person of ordinary skill in the art would have been motivated by the teachings of Shi to obtain the claimed invention.

Yamamoto fails to overcome the above deficiencies of Shi. More specifically, Yamamoto teaches an electroluminescent element that includes an organic compound layer formed of a thiophene polymer as a light emitting layer of a hole transport layer. See Yamamoto at Abstract. Yamamoto does not teach or suggest the composition of claim 1, from which claims 7-11 depend, comprising a fluorescent dye having substantially no substituents to allow the dye to attach (i.e., chemically bond) to a precursor polymer in the composition.

In particular, even though Yamamoto discloses the possibility of using luminescent materials selected from compounds including metal complex dyes, coumarin, quinacridone, rubrene and styryl dyes (see col. 11, line 62 - col. 12, line 3), Yamamoto does not teach or suggest the composition of claim 1. That is, nowhere does Yamamoto teach or even suggest a composition comprising a dye having substantially no substituents that allow the dye to chemically bond to a precursor polymer of the composition, as claimed in claim 1.

Furthermore, nowhere does Yamamoto teach or suggest modifying the disclosed element so as to arrive at the claimed invention. That is, because Yamamoto does not teach or suggest modifying the disclosed element to include a dye having substantially no substituent to allow the dye to chemically bond to a precursor polymer in the element, as claimed, Applicants

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respectfully submit that no person of ordinary skill in the art would have been motivated by the teachings of Yamamoto, either alone or in combination with the teachings of Shi, to obtain the claimed invention.

Mori fails to overcome the above deficiencies of Shi and Yamamoto. More specifically, Mori teaches an electroluminescent element comprising an anode, a cathode and disposed therebetween, an organic luminescent layer comprising a mixture of fluorescent luminescent agent, at least one hole moving and donating agent capable of moving holes and donating the same to the luminescent agent, and at least one electron moving and donating agent capable of moving electrons and donating the same to the luminescent agent. See Mori at Abstract. Mori does not teach or suggest the composition of claim 1, from which claims 7-11 depend, comprising a fluorescent dye having substantially no substituents that allow the dye to attach (i.e., chemically bond) to a precursor polymer in the composition.

In particular, even though Mori teaches the possibility of using numerous fluorescent dyes including coumarin dyes (see col. 24, lines 3-36), Mori does not teach or suggest the composition of claim 1. That is, nowhere does Mori teach or suggest an element comprising a dye lacking any substituents to enable the dye to chemically bond to a precursor polymer of the element, as claimed in claim 1.

Furthermore, nowhere does Mori teach or suggest modifying the disclosed element so as to arrive at the claimed invention. That is, because Mori fails to teach or suggest modifying the disclosed element to include a dye having substantially no substituents to enable the dye to attach to a precursor polymer in the element, as claimed, Applicants respectfully submit that no person of ordinary skill in the art would have been motivated by the teachings of Mori, either alone or in combination with either Shi or Yamamoto, to obtain the claimed invention.



For at least these reasons, the claimed invention would not have been obvious over Shi in view of Yamamoto, and further in view of Mori. Reconsideration and withdrawal of the rejection are respectfully requested.

B. Claims 13 and 16-17

The Office Action rejects claims 13 and 16-17 under 35 U.S.C. § 103(a) as having been obvious over Shi. The Office Action alleges that the claimed invention would have been obvious over the composition of Shi for all of the reasons set forth in the previous Office Action. Applicants respectfully traverse this rejection.

For all of the reasons discussed above, Shi does not teach or suggest the composition of claim 1, from which claims 13 and 16-17 depend, comprising a dye having substantially no substituent to allow the dye to attach (i.e. chemically bond) to a precursor polymer in the composition. Instead, Shi specifically teaches the opposite -- dyes having nucleophilic substituents that are chemically bonded to the precursor polymer of the disclosed composition. Because Shi does not teach, or even suggest, the possibility of a composition comprising a dye lacking any substituents that allow the dye to bond to the precursor polymer of the composition, Applicants respectfully submit that the claimed composition would not have been obvious from the composition of Shi.

Furthermore, as previously explained, Applicants respectfully submit that because Shi provides no motivation whatsoever to modify the disclosed composition to include a dye that lacks the requisite substituents to bond to the precursor polymer of the disclosed composition, no person of ordinary skill would have been motivated by the teachings of Shi to obtain the claimed composition.

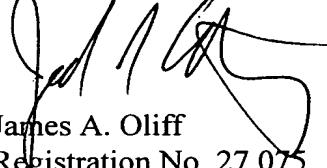
For at least these reasons, the claimed composition would not have been obvious over the composition of Shi. Reconsideration and withdrawal of the rejection are respectfully requested.

VI. Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that the instant application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully solicited.

Should the Examiner believe that anything further is necessary in order to place the application in condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number provided below.

Respectfully submitted,

  
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Attachments:

Appendix  
Request for Approval of Drawing Corrections

Date: January 26, 2001

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DEPOSIT ACCOUNT USE  
AUTHORIZATION  
Please grant any extension  
necessary for entry;  
Charge any fee due to our  
Deposit Account No. 15-0461

## APPENDIX

### Changes to Figures:

Figures 3 and 5 are amended as set forth in the attached Request for Approval of Drawing Corrections.

Figure 4 is deleted without prejudice to or disclaimer of the subject matter therein.

### Changes to Specification:

Paragraph at page 6, lines 12-14 is deleted.

Paragraph at page 6, lines 15-17, is amended.

Paragraph at page 32, lines 9-14 is amended.

The following are marked-up versions of the paragraphs at page 6, lines 15-17 and page 32, lines 9-14, respectively:

**[page 6, lines 15-17]** Fig. 4~~5~~ is a sectional view which shows steps performed in another embodiment of the manufacturing method of the present invention.

**[page 32, lines 9-14]** Fig. 4 is a diagram which shows wavelength at absorption of light at the each luminescent layers of the organic EL element in Example 1. As the result of measuring the wavelength at maximum absorption for the respective luminescent layers of the organic EL elements obtained in Examples 2 to 7, the same results were obtained.

### Changes to Claims:

Claim 15 is canceled without prejudice to or disclaimer of the subject matter therein.

Claims 1, 6 and 14 are amended as follows.

1. (Amended) A composition for an organic EL element for forming at least one luminescent layer having a certain color, said composition comprising:  
a precursor of a conjugated organic polymer compound for forming said luminescent layer; ~~and~~

at least one fluorescent dye for changing a luminescence characteristic of the luminescence layer, ~~wherein the dye is present in the composition but is not bonded with the precursor polymer; and~~

wherein the dye has substantially no substituent that is able to attach to the precursor polymer.

6. (Amended) The composition for an organic EL element as claimed in claim 5, wherein the polyarylene vinylene precursor includes a precursor of polypyridophenylene vinylene or a polypyridophenylene vinylene derivative ~~the conjugated organic polymer compound includes a polypyridophenylene vinylene precursor.~~

14. (Amended) The composition for an organic EL element as claimed in claim 2, wherein the ink-jet method uses an ink-jet device having a nozzle with a nozzle hole for discharging the composition, in which the composition contains a wetting agent for preventing the composition from being dried and solidified at the nozzle of the ink-jet device.